

# CIVIL AND CONSTRUCTION ENGINEERING TECHNOLOGY (CCET)

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## CCET 1503 CAD Technology 2 s.h.

Basic instruction in the use of AutoCAD computer-aided drafting system. Includes primary 2D skills including dimensioning, blocks, external reference and plotting. Customization methods and an introduction to application programming. One and one-half hours lecture, one and one-half hours lab per week. Grading is A, B, C, NC.

**Prereq.:** C or better in MATH 1510 or MATH 1510C.

**Prereq. or Coreq.:** MATH 1513 or MATH 1511 or 1511C or at least Level 45 on the Mathematics Placement test.

## CCET 1504 Drafting and Plan Reading 2 s.h.

Drafting basics including plan, section, and elevation views; orthographic projections; line types and weights; drafting scales; dimensioning; tolerances; grading and contours, and construction layout for the civil, mechanical, and electrical technology disciplines. Development of skills in the interpretation and preparation of plans used for civil, mechanical, and electrical construction and fabrication. One and one-half hours lecture, one and one-half hours laboratory per week. Grading is A, B, C, NC.

**Prereq.:** C or better in MATH 1510 or MATH 1510C.

**Coreq.:** MATH 1513 or MATH 1511 or MATH 1511C or at least level 45 on Mathematics Placement Test.

## CCET 2604 Properties and Strength of Materials 3 s.h.

Introduction to the physical and chemical properties of materials and their behavior under various loads and environments. Concepts of stress and strain developed and evaluated for the application of axial, shear, torsional, and bending loads. Four (4) hours lecture per week.

**Prereq.:** Grade of "C" or better in ENTC 1505 and MATH 1513 or MATH 1510 or MATH 1510C and MATH 1511 or MATH 1511C.

**Prereq. or Coreq.:** MET 1515.

## CCET 2607 Civil 3D 3 s.h.

Civil 3D is a course intended to prepare students for entry-level production use of AutoCAD Civil 3D 2015. The primary goal of this class is to teach students how to use the software, but it is also an opportunity to show them how projects are executed and what types of roles they will play in completing them. One (1) hour lecture and three (3) hours lab per week.

**Prereq.:** "C" or better in CCET 1503 and CCET 1504.

## CCET 2614L Materials Laboratory 1 2 s.h.

Use and care of testing equipment, data retrieval, data reduction and report preparation. Physical testing of metals, concrete, aggregates, asphalts, soils and woods. Three hours per week.

**Prereq. or Coreq.:** CCET 2604.

## CCET 2617 Construction Methods and Materials 3 s.h.

Basic properties of construction materials. Processing and placement methods. Purchase, use and replacement of construction equipment. Application of engineering economics to construction. Use of building codes.

**Prereq.:** CCET 2604, MET 1515 both with a grade of "C" or better.

## CCET 2620 Transportation Technology 3 s.h.

Transportation planning and highway system design. Familiarization with AASHTO design manuals; geometric design and signalization of highway segments; capacity analysis and route selection. Cost-benefit analysis for transportation projects. Four (4) hours lecture per week. **Prereq.:** "C" or better in CCET 2604.

## CCET 3705 Computing for Engineers 3 s.h.

Development of computer techniques used in solutions to problems in all fields of engineering technology. Students write computer programs to solve problems with which they are familiar. Use of database management, spreadsheets. Personal laptop computer required. Laptops may be rented from the university by the student if necessary. May be taken by non-CCET majors. Two hours lecture, three hours lab per week.

**Prereq.:** MATH 1570 or MATH 1571 grade of "C" or better and junior standing or consent of instructor.

## CCET 3706 Structural Design 4 s.h.

Structural design using AISC, ACI and similar codes. Selection of members and connections in accordance with manuals and code specifications. Design and AutoCAD projects required. Three hours lecture and three hours computational lab per week.

**Prereq.:** "C" or better in CCET 1503, CCET 1504, MET 1515, MATH 1513, MATH 1510 or MATH 1510C and MATH 1511 or MATH 1511C, CCET 2604.

## CCET 3708 Building Information Modeling 3 s.h.

Introduction and applications of Autodesk Revit 3D CAD program. Use of Revit software to assemble a complete building information model of a building and use the model to coordinate systems between disciplines, to create material take-offs, construction documents, and presentation drawings. Two hours lecture, three hours lab per week.

**Prereq.:** "C" or better in CCET 3706.

## CCET 3709 Structural Analysis 1 3 s.h.

Fundamental determination of member forces in trusses, beams, arches, frames and cables. Calculation of member stresses and deflections. Two hours lecture, three hours computational lab per week.

**Prereq.:** ENTC 1505, MATH 1513 or MATH 1510 or MATH 1510C and MATH 1511 or MATH 1511C and CCET 2604, all with a grade of "C" or better.

## CCET 3711 Specifications and Estimating 3 s.h.

Fundamentals of writing and interpreting specifications for materials and construction methods. Estimating materials and labor costs for construction projects. Use of computer estimating packages. Two hours lecture and three hours computational laboratory.

**Prereq.:** ENTC 1505, MATH 1513 or MATH 1510 or MATH 1510C and MATH 1511 or MATH 1511C, CCET 2604, MET 1515 all with grade of "C" or better.

## CCET 3714 Soil Mechanics 2 s.h.

A study of soil properties, classifications, strength and behavior. Theory of consolidation, shear strength and stability analysis. Two hours lecture per week.

**Prereq.:** "C" or better in the following courses CCET 2614L, CCET 3706, CCET 3709.

## CCET 3714L Soil Mechanics Laboratory 1 s.h.

Practice in soil identification and determination of soil properties. Use and care of basic soil testing equipment and standard test procedures. Three laboratory hours per week. Concurrent with: CCET 3714.

## CCET 3719 Environmental Impact of Abandoned Mines 3 s.h.

Mining methods, types of mines, information retrieval, mine stabilization, and the effects of abandoned mines on environmental and human activities, especially deep coal mines in the Mahoning Valley and adjacent areas. Two hours lecture and three hours of lab per week. **Prereq.:** GEOL 1505 or equivalent or permission of instructor.

## CCET 3724 Hydraulics and Land Development 3 s.h.

Study of hydraulics and hydrologic principles and their applications to drainage requirements, storm-water management, detention/retention basin design, erosion and sedimentation control plans and land-use planning. Use of computer software for analysis and design. Two hours lecture, three hours of computational lab per week.

**Prereq.:** CCET 1503, CCET 1504, ENTC 1505, MATH 1513 or MATH 1510 or MATH 1510C and MATH 1511 or MATH 1511C, CCET 2604, MET 1515 all with a grade of "C" or better.

**CCET 3735 Heavy Highway Technology 3 s.h.**

Study of principles of heavy highway construction as it relates to the current highway system. The reading and comprehension of highway construction plans and specifications. Three (3) hours lecture per week.

**Prereq.:** "C" or better in CCET 2620.

**CCET 3740 Construction Management 3 s.h.**

Design and construction office planning and scheduling techniques. Construction reports, contracts, specifications and general conditions. Relationships among owner, architect/engineer, and constructor. Introduction to computer methods for program planning and updating. Financial, labor, and material resource allocation and tracking. Three (3) hours lecture per week.

**Prereq.:** "C" or better in CCET 3711.

**CCET 4807 Project Planning & Scheduling 3 s.h.**

Application of planning, scheduling, and control system techniques for an integrated project including theory, options, legal implications, and practices. Students plan and schedule projects using CPM computer software and set up control systems for the project. Two hours lecture, one hour laboratory per week.

**Prereq.:** "C" or better in CCET 3711.

**CCET 4809 Structural Analysis 2 3 s.h.**

Continuation of CCET 3709. Analysis techniques for common structures. Introduction to classical approaches to statically indeterminate structures and calculation of deflections. Use of standard computer programs such as StruCalc, SAP and SABLE. Three hours lecture, one hour computational lab per week.

**Prereq.:** "C" or better in both CCET 3709 and MATH 1570 or MATH 1571.

**CCET 4810 Construction Surveying 3 s.h.**

Theory and applications of advanced land surveying techniques for: route surveying and geometric design; topographic site surveys and mapping; civil engineering, utilities, and construction surveys; global positioning systems; and quantities and final surveys. Two hours lecture and three hours field surveying laboratory.

**Prereq.:** "C" or better in CEEN 2610, CEEN 2610L.

**CCET 4812 Concrete Design 3 s.h.**

Behavior and design of concrete elements subject to flexure, shear, axial and combined effects. Emphasis on reinforced concrete design in accordance with the ACI Code including beams, T-beams, slabs, walls, and columns. An introduction to prestressed and precast concrete design. Two hours lecture, one hour design lab per week.

**Prereq.:** "C" or better in both CCET 3706 and CCET 3709.

**CCET 4813 Steel Design 3 s.h.**

Loading and behavior of steel structures and design of standard rolled shapes in accordance with current LRFD and ASD specifications. Design of welded and bolted connections and an introduction to design of cold-formed steel members. Two hours lecture, one hour lab per week.

**Prereq.:** "C" or better in both CCET 3706 and CCET 3709.

**CCET 4814 Foundation Design 3 s.h.**

Application of soil mechanics to the design of foundations. Topics include spread footings, drilled piers, piles, retaining walls, sheet piles walls and underground structures. Three hours lecture per week.

**Prereq.:** "C" or better in CCET 3714 and CCET 3714L.

**CCET 4815 Masonry Design 3 s.h.**

Design of beams, columns, shear walls and bearing walls using clay and concrete masonry units. Application of allowable stress design (ASD) and strength design (SD) in accordance with the MSJC Building Code Requirements for Masonry Structures. Additional topics include prestressed and autoclaved aerated concrete (AAC) masonry. Two hours lecture, one hour lab per week.

**Prereq.:** "C" or better in both CCET 3706 and CCET 3709.

**CCET 4816 Timber Design 3 s.h.**

Design of beams, poles, piles, diaphragms, shear walls and fasteners using timber elements. Application of the National Design Specification for Wood Construction that incorporates a dual format using both allowable stress design (ASD) and load and resistance factor design (LRFD). Additional topics include glued-laminated members and design of mechanical connectors. Design, analysis, construction, and testing of scale models is required. Two hours lecture, one hour lab per week.

**Prereq.:** "C" or better in both CCET 3706 and CCET 3709.

**CCET 4824 Environmental Technology 3 s.h.**

Application of environmental principles to land planning and development. Wastewater treatment processes and system design. Application of water and wastewater management to specific sites. Permitting and endangerment assessment. Two hours lecture, one hour lab per week.

**Prereq.:** "C" or better in CCET 3724 and junior standing.

**CCET 4884 Civil/Structural Facilities Design 3 s.h.**

Interdisciplinary capstone course. An overview of the requirements and design procedures for civil and structural systems. Includes the analysis and design for site development, utilities, foundation, wall systems, framing systems, floor system and the preparation of the plans, specifications and estimate package. Includes a major interdisciplinary group project. Four (4) hours lecture per week.

**Prereq.:** Senior standing in CCET or EET permission of instructor.

**Prereq. or Coreq.:** EET 4810.

**CCET 4890 Special Topics in Civil and Construction Engineering Technology 1-4 s.h.**

New developments in CCET. Subject matter, special prerequisites, and credit hours to be announced in advance of each offering. May be repeated with different subject matter to a maximum of 8 s.h.

**Prereq.:** Senior standing in CCET or consent of the instructor.